

REMARKS

Claims 3, 4, 6 and 8-14 are pending in the above-identified application.

Claim Amendments

By this amendment, claim 1 is cancelled. Claim 4 is amended to incorporate various limitations of claim 13. No new matter is added by this amendment. This amendment should accordingly be entered as no limitations are added to the claims not otherwise already considered by the Examiner.

Present Invention and Its Advantages

The present invention is directed to a golf ball having a paint film which contains a base resin made by curing an aqueous polyol and a polyisocyanate, wherein the aqueous polyol is an aqueous acrylic polyol, an aqueous polyester polyol, or an aqueous alkyd resin, as recited in the present claims. As noted at the bottom of page 1 of the present specification, conventional golf ball paint layers have been formed using "solvent borne" paints, such as urethane paints and epoxy paints which means that these paints are formed from components that dissolve in organic solvents, or non-aqueous components, such as non-aqueous polyol and isocyanate.

Thus, the production process requires the presence of disadvantageously large amounts of volatile organic solvents. In contrast, as noted at pages 1-2 of the specification, the golf ball paint film employed in the present invention is formed using an "aqueous" polyol selected from an aqueous acrylic polyol, an aqueous polyester polyol or an aqueous alkyd resin. It is noted an "aqueous" polyol has a chemical structure which allows the polyol to dissolve in an aqueous medium. This is well known in the polymer chemistry field and can be easily be confirmed by reference to a wide variety of sources. In contrast, a "solvent borne" or "non-aqueous" polyol has a chemical structure which allows this polyol to be dissolved in an organic medium, but not an aqueous medium.

The employment of the paint film for the golf ball of the present invention provides for advantages during the production process, since advantageously, large amounts of volatile organic solvents are not required during the production process of the golf ball of the present invention. In addition, the particular aqueous polyol components employed in the paint film of the present invention exhibit advantageously improved durability and advantageous reductions in production time as compared to a conventional golf ball paint film formed using a conventional aqueous polyol as noted at pages 1-2 of the present specification and as evidenced by the comparatively poor results shown by Example No. 4 in Table 3 at pages 30-31 of the present specification.

The claimed invention is neither disclosed nor suggested by the cited prior art.

Rejection under 35 USC 102(b)/102(e)/103(a)

Claims 1, 3, 4, 6, 10 and 13 stand rejected under 35 USC 102(b)/102(e)/103(a) as being unpatentable over Iwami '667. This rejection is respectfully traversed.

Iwami '667 discloses that various paints may be employed in the described golf ball production, including a “...urethane resin-based paint....prepared by reacting polyester polyol as a base material resin with isocyanate” (col. 3, lines 23-26). A review of all of the examples of Iwami '667 confirms that all of the exemplified polyols are “solvent borne”, or dissolvable in organic solvents, and not “aqueous” polyols which are dissolvable in an aqueous median.

Iwami '667 fails to disclose or suggest the employment of an “aqueous” polyol in a golf ball paint film as in the present invention. Despite the use of the generic term “polyester polyol” at column 3 of Iwami '667, it is clear from a correct interpretation of the context of Iwami '667 in view of all of the examples described therein that the golf ball paint layer described therein is used by employing “solvent borne” polyols, in contrast to the “aqueous” polyols employed in the present invention. Iwami '667 further fails to recognize the advantages associated with the present invention with regard to advantageous reduction in organic solvent amounts required for

golf ball paint film production. Further, Iwami '667 fails to recognize the advantages of the particular aqueous polyols employed in the present invention over conventional aqueous polyols as evidenced by the comparative test results discussed above.

In support of the rejection, the Examiner takes the position that, although the reference does not teach the use of an aqueous-based paint, "the final painted ball is the same regardless what carrier is used" since the "carrier has evaporated from the final ball".

The Office Action includes an assertion that the recitation in the present claims that the golf ball paint film is formed from "aqueous" components is irrelevant, since the finished golf ball paint film does not include any solvent and is the same as a golf ball paint film formed using an organic solvent. This position is incorrect, since the Patent Examiner is not allowed to simply ignore features recited in the present claims. The present claims recite that the golf ball paint film contains a base resin formed by curing an aqueous polyol and a polyisocyanate. Any relevant references cited by the Patent Examiner must disclose or reasonably suggest all of these recited features, including the use of an "aqueous" polyol. It is irrelevant that the finished golf ball paint film includes no solvent, because the present claims are not directed only to a finished golf ball, but rather directed to a finished golf ball having a paint film that contains a base resin made by curing and "aqueous" polyol and a polyisocyanate.

The Examiner further states that the final paint thickness is 5-20 microns, and the NCO/OH ratio is 1.2, each of which meet the limitations of applicants' claim 13.

In response, the aqueous polyol of the present invention has a hydroxyl value of from 50 to 100 mg KOH/g, and a weight average molecular weight of 5,000 to 20,000. A mixing ratio of the polyisocyanate to the aqueous polyol has a molar ratio (NCO/OH) of 0.8 to 1.6.

By contrast, the polyols disclosed in the reference fail to meet the claimed limitations as shown in the following Table:

	Present invention			
		Compositions 1 to 5	Composition 6	Composition 7
Hydroxyl value of polyol (mgKOH/g)	50-100	120 or 130 ¹⁾		
Molar ratio (NCO/OH)	0.8-1.6		0.7 ²⁾	
Average molecular weight of polyol	5,000-20,000			< 5,000 (Mixture of 4,500 and 5,000 ³⁾)

¹⁾ col. 5, lines 67 and col. 6, lines 54 -56

²⁾ col. 7, lines 5

³⁾ col. 7, lines 11-13

Further, the thickness of the paint film in the present invention (ranging from 6 μm to 13 μm) is distinguishable from the coating thickness of the outer paint layer disclosed at Table 3 of the reference (ranging from 15 μm to 20 μm).

The cited reference thus fails to anticipate the claimed invention.

With regard to the rejection under 35 USC 103(a), applicants note that the polyols disclosed in compositions 1 to 5 of the reference have a relatively higher hydroxyl value of 120 mg KOH/g or greater, while the polyol disclosed in composition 7 of the reference has a relatively lower molecular weight of less than 5000.

By contrast, it is demonstrated in the present invention (Table 3) that the polyol having a hydroxyl value exceeding 100 mg KOH/g , and a molecular weight of less than 4000 (polyol 4) requires a sharply increased curing time as compared to the polyols of the present invention (polyols 1 to 3). Applicants note that the pending claims require the molecular weight to range from 5000 – 20,000.

In addition, the polyol disclosed in composition 6 of the reference has a relatively lower mixing ratio of a polyisocyanate to the polyol (NCO/OH ratio of 0.7), which makes a curing reaction insufficient to cause a tackiness in the resulting paint film, according to the description of the present invention (page 9, lines 20-25).

The advantage achieved by the present invention of achieving adequate curing reaction with a shorter curing time by use of a polyol while also satisfying the specific range of the hydroxyl value, the molecular weight and the NCO/OH ratio, is not expected from the teachings of the reference (in particular, from the polyols of the reference), as the object of the reference is to improve wear-resistance (see column 7, line 22 to column 8, line 20).

The claimed invention is accordingly neither disclosed nor suggested by the cited reference. The rejection should accordingly be withdrawn.

Rejection under 35 USC 103(a)

Claims 1, 3, 4, 6 and 8-14 stand rejected under 35 USC 103(a) as being unpatentable over Patzschke '822 in combination with Iwami '667. This rejection is respectfully traversed.

In support of the rejection, the Examiner takes the position that the reference “exemplifies (#10) an aqueous coating composition of polyesterpolyol and polyisocyanate.” The Examiner also notes that the polyesterpolyol has a hydroxyl number of 82, with preferred molecular weights of 3000-6000. The Examiner further takes the position that Iwami teaches “similar polyesterpolyol + polyisocyanate coatings” on golf balls, and that it would thus be obvious to place the coating of Patzschke on golf balls.

In response, Patzschke '822 discloses aqueous coating compositions. Patzschke '822 fails to disclose or suggest the use of the described compositions in a golf ball paint film as in the present invention.

Further, Patzschke fails to disclose or suggest a mixing ratio of polyisocyanate to a polyol of 0.1 to 1 (column 7, lines 13-16). The paint composition of Iwami in which the NCO/OH ratio falls within the above range disclosed in Patzschke are compositions 4 and 5 (where the ratio is 1.0) and 6 (where the ratio is 0.7) - see column 6, line 25 - column 7, line 6. The hydroxyl values of compositions 4 and 5 are both 130 mg KOH/g which is beyond the range of the claimed invention. The NCO/OH ratio of 0.7 in composition 6 is below the range of the claimed invention.

Therefore, even if the coating of Patzschke is combined with any of the coating compositions of Iwami in order to coat a golf ball, the resultant composition would still fall short of yielding the claimed invention, and thus achieving the above-mentioned advantages of the present invention.

Further, although Patzschke considers a reduction in the amount of organic solvents in the lacquer industry (see col. 1, lines 11-15), it neither discloses nor suggests any of the resulting problems when the aqueous coating of Patzschke is used for a golf ball. On the other hand, the object of the golf ball of Iwami is to improve the wear-resistance of the paint compositions (column 7, line 22 to column 8, line 20).

Accordingly, a person of ordinary skill in the art would not be motivated to place the coating of Patzschke on the golf ball of Iwami in order to achieve the object of the present invention - i.e., shortened curing time - thereby maintaining higher productivity (see page 2, lines 11-24 of the specification).


In view of the above, the rejection is without basis and should be withdrawn.

The application is accordingly believed to be in condition for allowance, and an early indication of same earnestly is solicited.

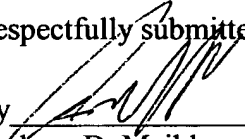
If any questions arise in the above matters, please contact Applicant's representative, Andrew D. Meikle (Reg. No. 32,868), in the Washington Metropolitan Area at the phone number listed below.

A check in the amount of \$120.00 is attached as payment for the one month extension of time.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.


Dated: March 21, 2006

Respectfully submitted,

By 

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